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High seroprevalence of bluetongue virus antibodies in goats in southeast Iran

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PEER REVIEW

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Comments

This work is interesting and contains novel data. This work can be future referenced in the field of veterinary science and tropical medicine. Its eminent finding is the seroprevalence from the area with limited data.
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ABSTRACT

Objective: To describe the seroprevalence rate of bluetongue virus (BTV) in goat flocks in southeast of Iran.
Methods: The blood samples were collected randomly from herds of southeast of Iran. A total of 93 sera samples were collected between 2011 and 2012. Antibodies to BTV in sera were detected by using a commercial competitive ELISA 3 according to manufacturer's instructions.
Results: The seroprevalence rates were 67.7% for goats. Within a herd, prevalence of BTV seropositive animals ranged from 33.3% to 100.0%. All goat flocks were positive to BTV antibodies.
Conclusions: This study describes a high seroprevalence rate of BTV in goat flocks in southeast of Iran for the first time.

KEYWORDS

Seroprevalence, Bluetongue virus, Goat, Iran

1. Introduction

Bluetongue is an Office International Epizooties (OIE) list A arthropod-borne viral disease caused by the bluetongue virus (BTV)[1]. List A diseases are those diseases which can spread rapidly and that have a considerable impact on the health of livestock[2]. The virus is infectious but non-contagious, affecting domesticated and wild ruminants[1]. The disease is not contagious and is transmitted biologically by certain species of Culicoides[3]. Infection occurs in a number of animals but significant disease occurs only in sheep. Cattle are the major reservoir host for sheep. Under natural conditions infection occurs in sheep and cattle, but rarely occurs in goats[4]. Adults either lose their fleece from a break in the growth of the staple or develop a weakness (tender wool) that causes breaks in processing and markedly reduces the value of the fleece. Pregnant ewes commonly abort. There is a severe loss convalescence is prolonged, particularly in lambs. The loss from clinical disease and from reduced wool quality and suboptimal production following infection in sheep are significant[5]. In cattle the infections are usually inapparent and evidence of clinical disease is seldomly observed. However, indirect

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losses associated with loss of body weight and condition, drop in milk production and poor subsequent reproductive performance were thought to have greater economic effect than occasional overt disease[6]. Mortality varies with the serotype but can be significant and it is estimated that the incursion of the disease in Europe since 1998 has caused sheep death of over 1 million[7]. Various techniques have been used to detect antibodies against BTV. These include agar gel immunodiffusion, hemagglutination-inhibition, complement fixation and ELISA, which are serogroup specific and serum neutralization, which is serotype specific. Although all these assays are available, only agar gel immunodiffusion and competitive-ELISA are recommended as prescribed tests for international trade in the OIE Manual of Standards for Diagnostic Tests and Vaccines[1]. The incursive disease has occurred in Portugal, Spain and Reece but until very recently bluetongue was not considered an endemic[8]. To the best of our knowledge, no report has been published on bluetongue disease of goat flocks of southeast of Iran. The objective of this study was to describe the seroprevalence rate of BTV in goat flocks in southeast of Iran.

2. Materials and methods

2.1. Sample preparation

The blood samples were collected randomly from goat flocks of southeast of Iran. A total of 93 sera samples were collected between 2011 and 2012. Blood was collected into sterile tubes by jugular vein puncture.

2.2. Detection of antibodies

Blood samples were centrifuged, and sera were gathered and stored at −20 °C. Antibodies to BTV in sera were detected by using a commercial competitive ELISA (Institute Pourquier, Montpellier, France) according to manufacturer's instructions.

3. Results

The seroprevalence rates were 67.7% for goats. Within a herd, prevalence of BTV seropositive animals ranged from 33.3% to 100.0%. All goat flocks (100%) were positive to BTV antibodies. Number of herds, samples, positive samples and seroprevalence rate in each herd were presented in Table 1.

Table 1
Number of herds, samples, positive samples and seroprevalence rate in each herd.

Number of herd	Number of samples	Number of positive samples	Seroprevalence rate (%)
1	17	9	52.9
2	16	12	75.0
3	14	11	78.5
4	8	7	87.5
5	8	7	87.5
6	8	4	50.0
7	8	3	37.5
8	6	2	33.3
9	4	4	100.0
10	4	4	100.0
Summation	93	63	67.7

4. Discussion

In present study the apparent seroprevalence rate was 67.7% for goats. The first evidence of bluetongue disease in 10 pregnant camels from Southeast Iran was reported by Mahdavi *et al*. in 2006[9]. Two serological investigations of BTV in cattle and sheep of Southeast Iran were done and the seroprevalence rates were 2.13% and 6.57% respectively[10,11]. A seroprevalence (34.7%) of BTV seropositivity was reported in sheep flocks in West Azerbaijan, Iran. They presented that 172 of 184 flocks included BTV seropositive sheep (93.5%)[12]. All goat flocks (100%) were positive to BTV antibodies in the present study. Seroprevalence of BTV among goats in Nagpur district of Vidarbha region was 27.95%[13]. The prevalence of BTV antibodies in goats in coastal saline area of West Bengal, India was 47%[14]. High seroprevalence of BTV antibodies in sheep (54.1%), goats (53.3%), cattle (44.8%) and camel (25.7%) in different districts of Saudi Arabia was reported[15]. Higher prevalence of bluetongue in goats (58.01%) has also been reported[16]. The highest previous reported rate of seroprevalence, was 66.95% in goats of West Bengal, India[17].

BTV seropositive reactions were obtained in 184 (48.4%) out of 380 tested sera, and in 89.5% (34/38) of the sheep flocks in North West Frontier Province, Pakistan. In the 34 seropositive flocks, the prevalence ranged from 12.5% to 100% (median=47)[18]. BTV seropositivity rates in sheep were detected as 29.5% in southeastern Turkey[19]. Our results revealed high seroprevalence (67.7%) of BTV infection which was comparable to that has been described amongst ruminants.

BTV is currently recognized to infect domestic ruminants on the continents of the Africa, Asia, North America and

Australia and several islands. As a general rule one can now consider that BTV infects live stock populations in all countries lying in the tropics and sub-tropics primarily between latitudes 40° N and 35° S[20].

The geographical alignment of Iran suggests latitude of 32°00′ N and longitude of 53°00′ E. The geographical alignment of southeast of Iran suggests latitude of 30°00′ N and 57°00′ E. Thus the occurrence of BTV infection in southeast of Iran was expected.

The distribution and intensity of infection in regions of the continents is determined by the climate, geography and altitude, as they affect the occurrence and activity of the Culicoides vectors and by the presence of susceptible mammalian hosts[7,20,21]. Climate is a major risk factor as Culicoides require warmth and moisture for breeding, feeding and calm[7]. A cold winter or a dry summer can markedly reduce vector numbers and risk for diseases. Moisture may be in the form of rivers and streams or irrigation but rainfall is the predominant influence and rainfall in the preceding months is a major determination of infection. Optimal temperature is also essential and in endemic areas because survival of the adults and larvae requires temperatures sustained above a mean of 12.5 ℃ for the cooler months and temperatures in the range of 18 to 30 ℃ in the summer and autumn for optimum recruitment of adults and for optimal activity[22-25].

The climate of southeast of Iran varies in different regions. The north, northwest, and central areas experience a dry and moderate climate, whereas in the south and southeast, the weather is warm and relatively humid. The province of Kerman and the surrounding regions have a semi-moderate and dry climate, with a maximum and minimum temperature of 39.6 ℃, and −9 ℃ respectively.

The high seroprevalence rates (67.7%) in the present study could indicate that there has been virus infection in goats in this region and consequently this is a threat to the native breed of other ruminants[14]. In this manner, present study indicates that serological evidence of exposure to infection was widely distributed all over the region. Since, there are no restrictions on the movement of animals from one region to another within the country, thus, outbreaks may also occur due to transportation of animals. Consequently, a well-defined control strategy for preventing and controlling the BTV may be based not only on vaccination plans and vector eradication but also restriction on the movement of animals from one region to another within the country[15]. Furthermore, high seroprevalence rates (67.7%) in the present study comparing with the other two previous studies in this region in other ruminants[10,11] may be attributed to conditions such as smuggling of animal, specially goat, from neighbor countries.

This study describes the seroprevalence rates of BTV in goat flocks in southeast of Iran for the first time. To determine exact prevalence, a large number of samples should be tested. Further studies are being undertaken to determine the BTV serotypes that are circulating in this region.

Conflict of interest statement

We declare that we have no conflict of interest.

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Comments

Background

This work reports on seroprevalence of BTV antibodies in goats in Southeast Iran. The data is from the geographical area that is not frequently mentioned. This work contained interesting epidemiological data and can be publishable.

Research frontiers

This work has some novelties and report on interesting veterinarian epidemiological study. The work can be a good referencing paper for the followers who investigate the seroprevalence in other parts of the world.

Related reports

This work has an interesting for novelty and report on the area that lack for information. It is no doubtful for the clinical usefulness of the reported data. The result can be referable since there is no previous similar report in the same aspect from the same area of Iran.

Innovations and breakthroughs

This work has novelty and report on incomplete area that needs a study to fulfill. There is no problem that this work can be further references. The work contains new information on epidemiology from limitedly investigated area.

Applications

This work can be further applied in the field of veterinary science. It can also be a good data in the tropical medicine field. The application is mainly on epidemiology aspect. Disease control attempt can be based on the finding in this report.

Peer review

This work is interesting and contains novel data. This work can be future referenced in the field of veterinary science and tropical medicine. Its eminent finding is the seroprevalence from the area with limited data.

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